



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER OF PATENTS AND TRADEMARKS  
Washington, D.C. 20231  
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/884,720	06/19/2001	Richard R. Hengst	6096-01	2520

7590 03/19/2003

McCormick, Paulding & Huber  
City Place II  
185 Asylum Street  
Hartford, CT 06103-3402

EXAMINER

KACKAR, RAM N

ART UNIT PAPER NUMBER

1763

10

DATE MAILED: 03/19/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/884,720

Applicant(s)

HENGST, RICHARD R.

Examiner

Ram N Kackar

Art Unit

1763

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 24 February 2003.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-16 and 29-32 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-16 and 29-32 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.  
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
a) ☐ All b) ☐ Some \* c) ☐ None of:  
1. ☐ Certified copies of the priority documents have been received.  
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.  
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).  
\* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☒ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).  
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s). \_\_\_\_\_
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) \_\_\_\_\_ 6) ☐ Other: \_\_\_\_\_

## DETAILED ACTION

### *Claim Rejections - 35 USC § 112*

1. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

2. Claims 1-16 and 29-32 are rejected under 35 U.S.C. 112, first paragraph, as containing subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. In this instance the limitation that the wafer contact surface area is less than or substantially equal to  $\frac{1}{2}$  of the surface area of the wafer has no support in the specification.

### *Claim Rejections - 35 USC § 102*

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

4. Claims 1-2, 4-6, 11-15, 29-30 and 32 are rejected under 35 U.S.C. 102(b) as being anticipated by Richard R Hengst (US 5931666).

Hengst et al disclose a vertical wafer boat with plurality of support rods, support area being less than  $\frac{1}{2}$  of the area of the wafer (Fig 2), for supporting plurality of silicon wafers having ceramic body of SiC or recrystallized SiC (Col 2 line 60), having ceramic coating of SiC to prevent migration of impurities (Col 5 line 32-45) and surface roughness to prevent slip of less

Art Unit: 1763

than 1  $\mu\text{m}$  (Col 4 lines 14-22), horizontal base, top plate, support rods, plurality of slots, each having ceramic coating and surface finish (Fig 1).

***Claim Rejections - 35 USC § 103***

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. Claims 1-6, 9-16 and 29-32 are rejected under 35 U.S.C. 103(a) as being unpatentable over Inaba et al (JP 11016993) which later became (US Patent 6093644) in view of Larry S Wingo (US 6171400).

Inaba et al disclose a vertical wafer boat for supporting silicon wafers having ceramic body (Fig 1 and Col 1 line 34) having ceramic coating to prevent migration of impurities (Col 1 line 20) and surface finish over the coating to prevent slip in substrates of large diameters (Col 1 line 20) and at high temperature (Col 1 line 13), maximum roughness of the finish less than 10  $\mu\text{m}$  and an impurity of less than 0.1 ppm (Col 3 line 14 and 15), horizontal base (Fig 1-13), top plate (Fig 1-12), support rods (Fig 1-11) and plurality of slots (Fig -14), each having ceramic coating and surface finish (Col 2 line 47).

Inaba et al do not disclose the wafer contact surface to be less than  $\frac{1}{2}$  of the surface area of the wafer.

Wingo discloses a support surface less than  $\frac{1}{2}$  of the wafer area (Fig 1).

Therefore it would have been obvious to one of ordinary skill in the art at the time invention was made to have a support structure where enough clearance is allowed to the

Art Unit: 1763

loading/unloading mechanism and the underside of the wafer gets maximum exposure to the heat treatment process.

Regarding claim 16 Inaba et al do not disclose a stress relief slot and location notch.

Wingo discloses wafer boat having both stress relief slot and notches at the base (Fig 1).

Therefore it would have been obvious for one having ordinary skill in the art at the time invention was made to use the teaching of Wingo so as to be able to avoid problems due to thermal expansion and be able to place the boat correctly on processing platform.

7. Claims 7-8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Inaba et al (JP 11016993) which later became (US Patent 6093644) in view of Lu et al (US 5904778).

Inaba et al disclose ceramic coating of silicon carbide but do not disclose its thickness. Lu et al disclose SiC coating on sintered Silicon carbide being 100 $\mu$ m or less (Col 6 line 21-23).

Therefore it would have been obvious for one having ordinary skill in the art at the time invention was made to have a thickness of less than 100 microns because too thick a layer may have a tendency to peel.

#### *Response to Amendment*

8. Applicants arguments filed 02/26/2003 have been considered but not found to be persuasive. Applicant's arguments and examiners response follows:

Applicants most pervasive argument relates to the rejection of claims 16 and 28-32 under 35 U.S.C. 103(a) as being unpatentable over Inaba et al (JP 11016993) in view of Larry S Wingo.

Art Unit: 1763

Examiner agrees with the applicant about his reading of MPEP 706.02(j) and will state below why the three basic criteria as related to the rejection of these claims are met by the combination of Inaba et al and Larry S Wingo.

The motivations to combine

1 The reduced support area allows enough clearance to a transfer arm for load/unload. There is support for this suggestion in Wingo (Col 1 lines 53-55) where Wingo discloses concern for the ease of load/unload and rejects an earlier solution on this basis. This point was made in the last office action and was ignored by the applicant. Examiner's observation of Wingo's recognition of importance of the support to the question of slip was incorrectly attributed to a statement of motivation. The motivational statement was on page 4 first sentence and not on page 3 last sentence.

2 The reduced support area also allows the underside of the wafer more exposure to the heat treatment process (Col 4 line 63 to Col 5 line 3).

These reasons of motivation are important in view of the fact that larger support area would seem to help reduce the problem of slip by reducing sagging at even higher temperature.

Expectation of success

There would be a reasonable expectation of success of the combination because the advantages of reduced area related to the issue of load /unload and exposure of the rear of the wafer to process are disclosed by Wingo.

Include all limitations

The combined references teach all the limitations.

Art Unit: 1763

Regarding applicant's observation that Inaba and Wingo are directed to solving two different and unrelated types of problems.

Applicant has suggested that Wingo was concerned only about slip caused by gravitation and Inaba was concerned only about slip caused by friction and that the two were independent of each other. Contrary to what the applicant's remarks state, the slip caused by friction and by gravitation are not independent to each other because they are both affected by support at high temperature and are also eliminated by proper support (Wingo Col 2 lines 2-5 and Inaba Col 1 line 61 to Col 2 line 13).

"Teaching Away vs. Motivation To Combine"

Applicant has suggested that it is applicant's distinct impression that the Examiner believes that burden of establishing a "motivation to combine " can be met unless there is strong evidence not to combine the references. Examiner does not believe in above and has followed MPEP guidelines to examine this case and has provided positive motivation derived from the reference itself for the combination.

***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Ram N Kackar whose telephone number is 703 305 3996. The examiner can normally be reached on M-F 8:00 A.M to 5:P.M.

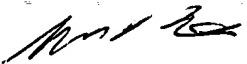
If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Gregory Mills can be reached on 703 308 1633. The fax phone numbers for the organization where this application or proceeding is assigned are 703 872 9310 for regular communications and 703 872 9311 for After Final communications.

Art Unit: 1763

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703 308 0661.

RK

March 17, 2003



BENJAMIN L. UTECH  
SUPERVISORY PATENT EXAMINER  
TECHNOLOGY CENTER 1700